Metro Transit
Design & Construction Section

King County METRO

Computer Aided Design Standards

Version 2.5.9 – August 2013

Find this document at http://your.kingcounty.gov/kcdot/transit/dcs/standards/Info/CAD.pdf
and at King county Metro Design & Construction's SharePoint Site page for Design & CADD Reference & Standards.

Computer Aided Design Guidelines

Contents

Introduction

These Standards are for use in all CAD projects for King County Metro Transit Design & Construction Division.

The purpose of these Standards is to provide a consistent manner in which CAD project drawings are created, published, maintained, and made accessible for future reference.

Within the enclosed Standards for electronic drafting files, some exceptions apply:

- Layer names listed in this document are set forth as a base guideline, with further definition in the standard format welcomed as required.
- The General blocks are for general use.

Drawing Media

The minimum Computer Aided Design program used by the Division at this time is AutoCAD 2013, saving as 2007 or better.

PDF's are acceptable as final as-built drawing deliverables from consultants, contractors and vendors only when CAD files were not the source of the original, as in field sketches. CAD files and corresponding PDF's with correct CAD display are requested.

Use standard A (8.5"x11"), ANSI B (11"x17") or ANSI D (22"x34") drawing sheets sizes as project requirements dictate.

Requirements for number of paper copy deliverables or pdf deliverables vary with project requirements. Timing, contents and format shall be determined by the Project Manager, in coordination with the Division's Milestone Review, Bid Posting, Contract and other requirements as applicable.

Drawing Package Organization

The following list serves as an outline and shall be conformed to the contents of the project.

Discipline Code

G - General
Drawing cover, drawing index, etc.

TEC - Temporary Erosion & Sedimentation Control
Temporary measures for erosion and sedimentation control.

C - Civil
Grading, paving, utilities, exterior site improvements, etc.

L - Landscape
Landscaping & irrigation.

A - Architecture
Building construction, building envelope systems, interior and exterior finishes.

S - Structural
Building structure and systems.

M - Mechanical
HVAC, piping, plumbing, equipment, etc.

FP – Fire Protection
Fire protection systems.

E - Electrical
Power, lighting, security systems.

T - Trolley
Trolley overhead systems.

TC – Traffic Control
Traffic control plans.

TS – Traffic Signal
Signalization and wiring.

U – Urban Design
Urban planning.

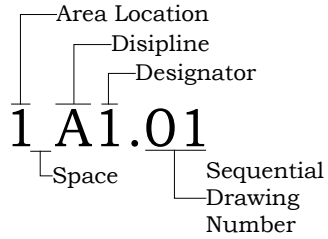
Sheet Designator

0 General (general symbols, legends, notes, etc.)
1 Plans (horizontal views)
2 Elevations (vertical views)
3 Sections (sectional views)
4 Enlarged Plans (partial plans)
5 Details

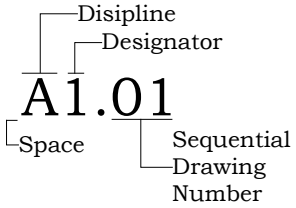
6 Schedules and Diagrams (P & ID's etc.)
7 User Defined
8 User Defined
9 3D views (isometrics, perspectives, photos)

Drawing Numbering

For Area Location field, use 1 and higher number when a project involves more than one building or site location. No Area Location number is required when there is only one work location.



Multiple Facility Locations in Contract



One Facility Location in Contract

Title Blocks

Title Block Border and File Organization

Two alternatives are acceptable:

1. The preferred method is external referencing of KCBORD.dwg into all the drawings. At a maximum, provide one border drawing per each discipline.
2. One border set per drawing, one drawing per file.
   - In this method, all title blocks are to be inserted in Layout/Paper Space at a scale of 1:1.

Each D-size title block/border drawing file contains four separate attributed blocks: (do not explode these, use the *ATTEDIT* command to fill in fields.

1. **KCBORD.dwg**

   The border line work and stationary project information:
   a. Facility name: *Facility or program involved in the project.*
   b. Installation: *Project title or installation*
   c. Date: *Current month name & 4-digit year*
   d. Sheet No.: *Total number of drawing sheets*
   e. Project Manager: *First initial & surname*
   f. Recommended: *Design Division Manager's first initial & surname*
   g. Approved: *Program Manager's first initial & surname*
   h. Project number: *Including subproject number, if applicable*
   i. Work order number: *Where applicable*
   j. Contract number: *When number is issued, usually by 90% review milestone*
   k. Site location number: *If available*

2. **SHTINFOD.dwg**

   Drawing specific information including:
   a. Description, lines 1, 2 & 3: *Drawing Title.*
      i. Use of all three lines is not mandated, and it is acceptable to arrange two of the three lines to be centered vertically.
   b. Drawing Number: *Per Disciplines section of this manual.*
      i. Example: G0.01 would be a General Information drawing with index, abbreviation, general notes, etc., but is not primarily a plan. G1.01 would be General Information, but containing plan information; such as a construction phasing plan.
   c. Drawing Sheet Number (sequential, shown also on Drawing Index)
   d. Drawing scale
   e. Designed: *Engineer, Architect or Designer's first initial & surname*
   f. Drawn: *Drafter's first initial & surname*
   g. Checked: *Discipline Supervisor's first initial & surname*

3. **DREV.dwg**
   a. Revision block information, for revisions after drawing release to Permit reviewers, Bidders or Contractors.

4. **XERD.dwg or XERB.dwg**
    a. This is a remote text block that identifies the file name, location, xref's, person plotting, date and time of plotting. Placed in the externally referenced Border drawing, each drawing will plot with the correct information for that drawing.

Typical Title Block Labeling Configuration

SHTINFOD as a block in the current file; and KCBORDD as an external reference, are displayed together on the Drawing sheet.

Abbreviations

All abbreviations used in a project plan set shall be identified in general or discipline-specific abbreviations lists.

- Do not use 'boiler plate' lists without conforming them to the Drawing Package.
- Do not include abbreviations not used, or cross-discipline duplicates.
- Excessive use of abbreviations is discouraged.
- Use punctuation only where the abbreviation forms a word.

Text and Font Styles

Text heights and styles shall conform to the following (at full-size):

- Arial or Arial Narrow: All drawing notation and dimension text
  Height = 1/8"

- Arial, Arial Narrow oer Arial Black: Subtitles and Labels
  Height = 3/16”
- Arial Black: Cover Sheet/ Project Title
  Height = ½”

Do not modify text width factors to less than 1.0”

Mtext Placement

Annotations can be placed in paper space or model space.

- Paper space placement is typically for project directives.
- Model space placement is typically for labeling of permanent items that must be identified for the Record.

Annotations with leaders should have flush left multi-line text.

- When to the right of the subject, the leader should lead from the top left line of the mtext.
- When to the left of the subject, the leader should lead from the lower right line of the mtext

For information and reference only, the chart on the following page shows the size of text when located in model space on drawings of different scales.

Text Height and Dimscale Chart

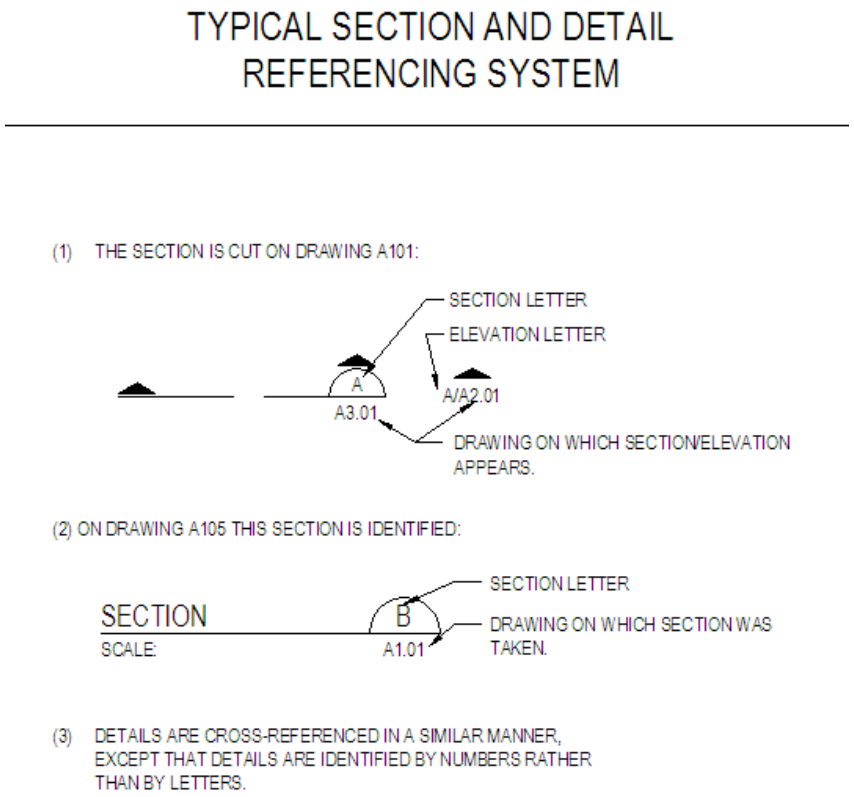
Dwg Scale	Text Height			Dimscale
	1/8"	3/16"	1/4"	
	0.125	0.1875	0.25	
1:100	12.5	18.75	25	100
1:60	7.5	11.25	15	60
1:50	6.25	9.375	12.5	50
1:40	5	7.5	10	40
1:30	3.75	5.625	7.5	30
1:20	2.5	3.75	5	20
1:10	1.25	1.875	2.5	10
1:5	0.625	0.9375	1.25	5
1:4	0.5	0.75	1	4
1:2	0.25	0.375	0.5	2
1:1	0.125	0.1875	0.25	1
2:1	0.0625	0.09375	0.125	0.5
4:1	0.03125	0.046875	0.0625	0.25
5:1	0.025	0.0375	0.05	0.2
10:1	0.0125	0.01875	0.025	0.1
1"=100'-0"	150	225	300	1200
1"=60'-0"	90	135	180	720
1"=50'-0"	75	112.5	150	600
1"=40'-0"	60	90	120	480
1"=30'-0"	45	67.5	90	360
1"=20'-0"	30	45	60	240
1"=10'-0"	15	22.5	30	120
1"=1"	0.125	0.1875	0.25	1
3"=1'-0"	0.5	0.75	1	4
1 1/2"=1'-0"	1	1.5	2	8
1"=1'-0"	1.5	2.25	3	12
3/4"=1'-0"	2	3	4	16
1/2"=1'-0"	3	4.5	6	24
3/8"=1'-0"	4	6	8	32
1/4"=1'-0"	6	9	12	48
3/16"=1'-0"	8	12	16	64
1/8"=1'-0"	12	18	24	96
3/32"=1'-0"	16	24	32	128
1/16"=1'-0"	24	36	48	192
1/32"=1'-0"	48	72	96	384

Reference Symbols

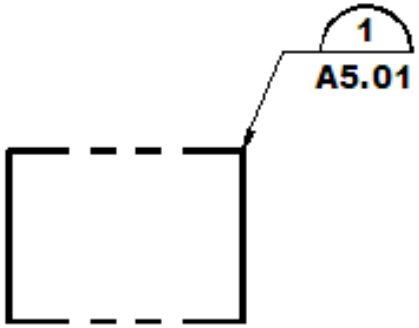
Drawing Referencing

Reference symbol usage is detailed in the AutoCAD block DSREF1.dwg, shown below. This block is to be included on the first General Information sheet, and its system used throughout the Drawing Package. In situations where the referenced drawing is not a direct (identical) representation of the original, the reference symbol may be adjacent to descriptive text (i.e. SIM, OPP. HAND).

Referencing symbols are provided in the 'Start' drawings, for use in labeling and referencing.

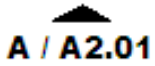


Detail or Partial Plan References



Elevation References

The filled triangle is to point in the direction of the view with the text oriented as shown. Elevations should be sequentially lettered.



Section References

Sections should be sequentially lettered.

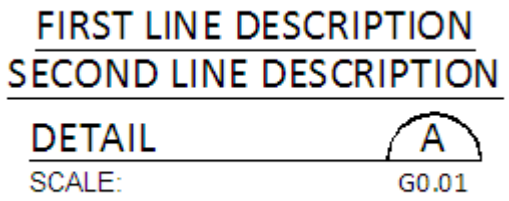
Referencing Note:

Number and letter sections and details in a separate sequence on each sheet. When the source of the section or details occurs on the same sheet, use "-".

Section Labels and Detail Labels

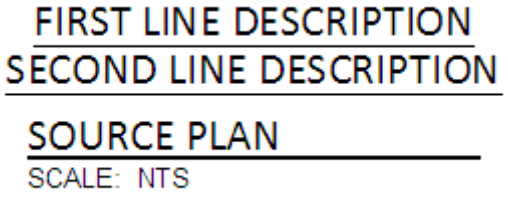
If a detail or section is referenced by (and applies to) two or less drawings, those drawings will be referenced in the drawing label. If a detail applies to more than two drawings, the drawing number reference will be labeled as VAR denoting VARIES, after listing at least one reference.

Label for use with one or two references.



Source Plan Label

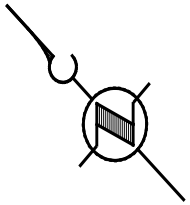
In large project drawing packages, source plans may be identified with a reference bubble at their original location.



Source Plan Label

North Arrows

North arrows are to be placed in the upper left-hand corner of the plan whenever possible. Plan north should be towards the top or to the left side of the drawing.



Bar Scales

Bar scales are used when requested as part of plan submittal standards by permitting agencies, and may be used as an accessory tool.

- The 'Start Drawings' contain a block or the parts thereof named 'scale.dwg'. This is a scale bar with associative dimensions in the 'scale bar' dimension style. This can be customized to the scale of viewports by using the CHSPACE command, and updating the scale bar dimension style.
- Fixed scale bar blocks are available in the 'Start Civil' drawing.

Layer Naming Convention

Layers use the following convention:

PLAN LEVEL	-	DISCIPLINE	LAYER STATUS	-	LAYER DESCRIPTION	SUPPLEMENTARY INFORMATION

Examples:

Building Plans:

PLAN LEVEL		*DISCIPLINE*	*LAYER STATUS*		*LAYER DESCRIPTION*	*SUPPLEMENTARY INFORMATION*
L1	**-**	**M**	**X**	**-**	**PIP**	**TXT**

L1-MX-PIPTXT Level-one mechanical existing piping text.

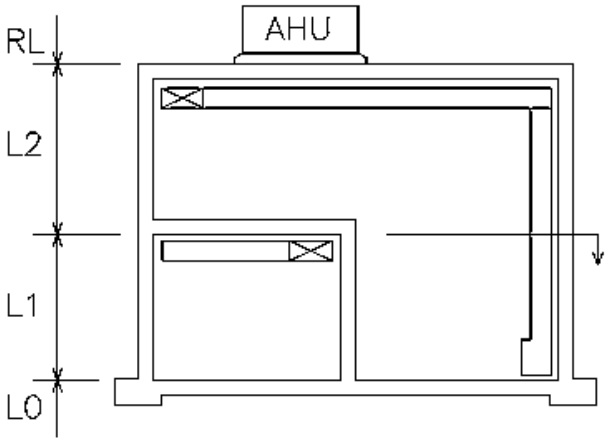
Civil & Trolley Plans

DISCIPLINE	*LAYER* STATUS*		*LAYER DESCRIPTION*	*SUPPLEMENTARY INFORMATION*
C	**x**	**-**	**stm**	**line**

CX-STMLINE Existing civil storm water system line

Plan Level:

RL - Roof Plan (birds' eye view to roof level)
L2 - Level 2 (below roof to next level or floor)
L1 - Level 1 (below 2nd floor or mezzanine ceiling to floor)
L0 - Foundation Plan (below 1st floor slab)
(For buildings with three or more levels, use L and the level number.)



Discipline:

G = General, including functional
C = Civil
A = Architectural
S = Structural
M = Mechanical
E = Electrical
T = Trolley

Layer Status:

(*) placeholder

Status	Definition	Plotting Line Weight (Extra fine, fine, medium, heavy and bold)
X	Existing	Extra fine or screened
D	Demolition	Heavy dashed line at perimeter; hatched field or 'X' over item.
R	Relocated	Bold
N	New	Bold
T	Temporary	Bold

Layer Description:

By naming. See Standard Layer Names, below.

Layer Supplementary Information

CND	Conduit
EQP	Equipment
HAT	Hatching
LINE	Plan line
RET	Return
SUP	Supply
SYM	Plan symbol
TXT	Associated text
PLU	Plumbing
***	Additional description as required

Standard Layer Names

XX = Designates placeholder for Plan Level field (L0, L1, L2, RL or as required)
Section, Elevation, Detail and Line Schematic layers do not use XX designation.

General Layers

GN-TXT	Annotations, labels, legends & notes on General drawings
0	Drawing frames or other non-specific line work
VP	Viewports. Set to non-printing layer status.
0	Title block.
0	Title block attribute text.
0	Title block attribute text.

Civil Layers

Plans, Sections and Details

C*-ACPLINE	Pavement edges: Asphalt concrete pavement
C*-BDGLINE	Buildings, storage structures
C*-BOLSYM	Bollards or posts
C*-CENLINE	Roads centerline: Schematic measurement, when monumentation not available
C*-CRBLINE	Curb front face, & back of curb if sidewalk not present.
C*-EASLINE	Easement lines
C*-EASTXT	Easement text and dimensional information
C*-FNCLINE	Fences
C*-FTDLINE	Footing drain line
C*-FUESYM	Fuel storage tanks & valves
C*-FUELINE	Underground fuel lines
C*-GASLINE	Gas lines, natural and propane
C*-GASSYM	Gas line valves & meters
C*-GRDLINE	Grade line: Schematic
C*-GRVLINE	Pavement edges: Gravel pavement
C*-GUTLINE	Gutter edge of concrete curb & gutter at roadway pavement.
C*-IRRLINE	Irrigation systems
C*-MONLINE	Monument lines
C*-MONSYM	Monuments
C*-OHPLINE	Above ground power and telephone lines
C*-OHPSYM	Overhead power utility poles & structures
C*-PAVLINE	Pavement edges: Material not specified

C*-PCCLINE	Pavement edges: Portland cement concrete pavement
C*-PLALINE	Plants, trees, shrubs
C*-PLASYM	Plants, trees, shrubs
C*-RDNLINE	Roof drain lines
C*-SAWLINE	Saw cut line
C*-STPLINE	Channelization, parking, bus staging pavement markings
C*-STPSYM	Channelization, parking, bus staging pavement markings: symbols
C*-PRPLINE	Property lines
C*-PRPSYM	Schematic property line symbol; monuments
C*-PRPTXT	Property line bearings & distances
C*-PTS	Topographic points
C*-PTSDESC	Topographic point: Descriptive text attribute
C*-PTSELEV	Topographic point: Elevation text attribute
C*-PTSNUM	Topographic point: Number text attribute
C*-RRDLINE	Railroad tracks or other rail lines
C*-SEWLINE	Sewer conveyance systems lines
C*-SEWSYM	Sewer conveyance systems features
C*-SEWTXT	Sewer conveyance systems text
C*-SGNSYM	Signs
C*-SITLINE	Surface features, undefined
C*-SITSYM	Surface features, undefined
C*-STMLINE	Storm drain systems
C*-STMSYM	Storm water conveyance systems features
C*-STALINE	Stationing lines
C*-STRLINE	Site structures: stairs, rockeries, retaining walls
C*-TELLINE	Telephone & communication system lines
C*-TELSYM	Telephone & communication systems features
C*-TFSLINE	Traffic signal system lines
C*-TFSSYM	Traffic control utilities
C*-TOPLINE	Topographic contour lines
C*-TOPTXT	Topographic contour text
C*-UGELINE	Underground electrical lines
C*-UGESYM	Electrical hand holes, vaults

C*-WETLINE	Wetland demarcation
C*-WFRLINE	Fire protection system water line
C*-WFRSYM	Fire protection system water features
C*-WFTSYM	Water conveyance system fittings
C*-WTRLINE	Water conveyance system lines
C*-WTRSYM	Water conveyance system surface features
C*-WLKLINE	Walkways & sidewalks: define with pcc or acp when necessary

Civil Layers

General

C*-TXT	Text: Annotations, labels, north arrows & notes; project directives

Architectural Layers

Building Plans

XX-A*-CLG	Ceiling surface variations, suspended ceiling system.
XX-A*-CLGTXT	Ceiling text.
XX-A*-CLGFV	Smoke vent.
XX-A*-CLGWIN	Skylight.
XX-A*-CLGWINTXT	Skylight associated text.
XX-A*-DIM	Plan dimensions.
XX-A*-DOR	Doors.
XX-A*-DORTXT	Door associated text.
XX-A*-EQP	Interior or exterior finish features: platforms, accessibility devices, cabinets, etc.
XX-A*-EQPCRI	Roof Crickets.
XX-A*-EQPFV	Smoke vent at roof plan.
XX-A*-EQPPADS	Walkway pads on roof surface.
XX-A*-EQPPLU	Plumbing fixtures.
XX-A*-FLR	Floor surface variations, grates, stairs.
XX-A*-FLRHAT	Hatching to delineate floor surface variations.
XX-A*-GRD	Building grid system, use once for all levels.
XX-A*-RDN	Roof drains.
XX-A*-ROF	Roof outline, changes in plane.

XX-A*-TXT	Text: Room numbers and descriptions; annotations, labels and general notes.
XX-A*-WAL	Interior and exterior walls, including roof parapet.
XX-A*-WALHAT	Hatching or polyline delineators for fire-rated or insulated wall types.
XX-A*-WALTXT	Wall associated text.
XX-A*-WIN	Windows, including skylights at roof level.

Architectural Layers

Details & Sections

A*-CON	Concrete
A*-DIM	Dimensions
A*-GLS	Glazing
A*-GND	Ground grade
A*-GWB	Gypsum wall board, cement board or plaster
A*-INS	Insulation
A*-MTL	Metal
A*-PLA	Plastic or fiberglass
A*-TXT	Text: annotations, labels, north arrows & notes.
A*-WOD	Wood
A*-WODHAT	Hatching, wood

Structural Layers

Building Plans

XX-S*-BRA	Structural bracing in detailed framing plans.
XX-S*-COL	Structural columns in detailed framing plans.
XX-S*-DIM	Plan dimensions
L0-S*-FND	Foundation walls. Interior line and below grade.
XX-S*-FNDEXT	Foundation walls. Exterior line above or below grade.
XX-S*-FNDTXT	Foundation associated text
XX-S*-FRA	Structural framing elements.
XX-S*-PLA	Structural plates in detailed framing plans.
XX-S*-TXT	Structural text: plan annotations

Structural Layers

Details & Sections

S*-ACP	Asphalt concrete pavement
S*-CON	Concrete, cast-in-place or precast
S*-DIM	Dimensions
S*-GND	Ground grade
S*-GRV	Gravel
S*-GWB	Gypsum wall board, cement board or plaster
S*-MTL	Metal
S*-PLA	Plastic or fiberglass
S*-TXT	Text: annotations, labels, north arrows & notes.
S*-WOD	Wood
S*-WODHAT	Hatching, wood

Mechanical Layers

Building Plans

XX-M*-DRN	Drains: roof drains, rain leaders, floor drains, industrial waste, etc.
XX-M*-DRNTXT	Drains associated text
XX-M*-DIM	Plan dimensions
XX-M*-EQP	Mechanical equipment: pumps, cranes, etc. Not HVAC
XX-M*-EQPTXT	Mechanical equipment associated text
XX-M*-FIR	Fire protection system piping
XX-M*-FIRTXT	Fire protection system text
XX-M*-FIRSYM	Fire protection system sprinklers
XX-M*-HEQ	HVAC equipment: air handling units, ventilators, controls, etc
XX-M*-HEQTXT	HVAC equipment associated text
XX-M*-HVD	HVAC system ductwork: non-defined
XX-M*-HVDTXT	HVAC system ductwork associated text
XX-M*-HVDR	HVAC system ductwork: return air
XX-M*-HVDRTXT	HVAC system ductwork: return air associated text
XX-M*-HVDS	HVAC system ductwork: supply air

XX-M*-HVDSTXT	HVAC system ductwork: supply air associated text
XX-M*-LFT	Hydraulic lifts: platform lifts, axle lifts, surface lifts, ancillary lift controls ,etc.
XX-M*-LFTTXT	Hydraulic lifts associated text
XX-M*-PIP	Piping system: non-defined
XX-M*-PIPTXT	Piping system associated text
XX-M*-PLG	Plumbing system: domestic water (potable & non-pot), waste, drains, vents
XX-M*-PLGTXT	Plumbing system associated text
XX-M*-TXT	Mechanical text: plan annotations
XX-M*-VEH	Vehicle exhaust systems: ductwork, reels, fans, etc.
XX-M*-VEHTXT	Vehicle exhaust systems associated text

Mechanical Layers

Details & Sections

M*-DIM	Dimensions
M*-EQP	Mechanical equipment
M*-FIR	Fire protection system piping
M*-HEQ	HVAC equipment
M*-HVD	HVAC system ductwork: non-defined
M*-LFT	Lifts
M*-PIP	Piping system: non-defined
M*-PLG	Plumbing system: non-defined.
M*-TXT	Text: annotations, labels, north arrows & notes.
M*-VEH	Vehicle exhaust systems

Electrical Layers

Building Plans

XX-E*-COM	Communications: telephone, data, intercoms. This includes ceiling, wall, and floor plugs (jacks).
XX-E*-COMCND	Communications: conduit
XX-E*-COMEQP	Communications: control consoles, receivers, and panel boards.
XX-E*-COMTXT	Communications associated text
XX-E*-DIM	Plan dimensions
XX-E*-ELTG	Emergency lighting systems surface features; wall, floor, pendent and ceiling mounted fixtures.

XX-E*-ELTGCND	Emergency lighting systems: conduit
XX-E*-ELTGEQP	Emergency lighting systems: wall toggle and dimmer switches, low voltage relay panels and emergency control panels.
XX-E*-ELTGTXT	Emergency lighting systems associated text
XX-E*-EPNL	Generator fed power / lighting
XX-E*-EPNLCND	Feeders (Homeruns) for emergency power panels
XX-E*-EPNLTXT	Text for emergency panel
XX-E*-EQP	Powered equipment, HVAC , (any hardwired equipment to a power source)
XX-E*-EQPCND	Powered equipment: conduit, homeruns, j-boxes
XX-E*-EQPEQP	Powered equipment, HVAC switches, thermostats, etc.
XX-E*-EQPTXT	Powered equipment associated text
XX-E*- FPS	Fire protection devices / appliances, facp, etc
XX-E*-FPSCND	Conduit for above
XX-E*-FPSTXT	Text for above
XX-E*-LTG	Light fixtures, non-emergency
XX-E*-LTGCND	Light fixtures: conduit
XX-E*-LTGEQP	Light fixtures: switches, contactor panels, motion sensors, for normal lights
XX-E*-LTGTXT	Light fixture: Text for normal lights
XX-E*-PNL	Power panels 480/277, 120/240, and 120/208 (includes “lighting” power panels)
XX-E*-PNLCND	Feeders for power panels
XX-E*-PNLCNDTXT	Feeder text for power panels
XX-E*-PNLPLUG	Ceiling level panels (Plug Bus)
XX-E*-PNLTXT	Electrical panel associated text
XX-E*-PWR	Receptacles
XX-E*-PWRCND	Receptacles: conduit
XX-E*-PWRTXT	Receptacle associated text
XX-E*-PWREQP	Cord-plugged equipment
XX-E*-SCR	Security equipment: card readers, cameras, alarms, sensors
XX-E*-SCRCND	Security equipment: conduit
XX-E*-SCRTXT	Security equipment associated text
XX-E*-UGE	Underground power conduit
XX-E*-UGECOM	Underground communication circuit
XX-E*-UGEDAT	Underground data conduit

XX-E*-UGETEL	Underground telephone conduit
XX-E*-UGEEQP	Equipment in vaults (transformers, etc...)
XX-E*-UGEVLT	Vaults, handholes, etc...
XX-E*-UGETXT	Text for above

Electrical Layers

Details & Sections

E*-CND	Conduit
E*-DIM	Dimensions
E*-EQP	Electrical equipment
E*-TXT	Text: annotations, labels, north arrows & notes.

Electrical Layers

One Line, SCADA & Panel Schedules

E*-TXT	Text
E*-LIN	Lines

Trolley Layers

Street Overhead

T*-RES	Resultant load
T*-RESTXT	Resultant load text
T*-SPWLINE	Span wire
T-SPWSYM	Span wire equipment
T*-SPWTXT	Span wire text
T*-STRSYM	Trolley support structure, present at ground level
T*-STRFND	Trolley support structure, foundation below grade
T*-STRSPW	Trolley support structure, at span wire level only (mast arms)
T*-STRTXT	Trolley support structure text
T*-TWNLINE	Trolley negative run wire
T*-TWPLINE	Trolley positive run wire
T*-TXT	General trolley system text

Trolley Layers

Yard System at Atlantic Base

T*-RES-53	Resultant load
T*-RESTXT-53	Resultant load text
T*-SPWLINE-53	Span wire
T*-SPWTXT-53	Span wire text
T*-STRSYM-53	Trolley support structure, present at ground level
T*-STRFND-53	Trolley support structure, foundation below grade
T*-STRSPW-53	Trolley support structure, at span wire level only
T*-STRTXT-53	Trolley support structure text
T*-TWNLINE-53	Trolley negative run wire
T*-TWPLINE-53	Trolley positive run wire

Trolley Layers

Inside Wiring at Atlantic Base

L1-T*-CDP	Positive wires in conduit
L1-T*-CDN	Negative wires in conduit
L1-T*-CTW	Control wiring, low and high voltage
L1-T*-GND	Ground Wire
L2-T*-TWN	Trolley negative run wire
L2-T*-TWP	Trolley positive run wire
L*-T*-***TXT	Extension for associated text layer

Substation Site Codes

00 – Not Site Specific
01 – Lower Queen Anne
02 – Upper Queen Anne #2
03 – Upper Queen Anne #3
04 - Madrona
05 - Bellevue
06 - Capitol

07 - Marion
08 – Bob Sharp (previously “University”)
09 – First Hill
10 – Mt Baker
11 – M.L.K.
12 - Collins
13 – North Broadway
14 – Atlantic #1
15 - Atlantic #2
16 - Market
17 - West Woodland
18 - Meridian
19 - Montlake
20 – Waterfront Street Car
21 - Central
22 – Broad St.
23 – Beacon Hill
24 - Maple
25 – Rainier Beach
26 - Roxbury
27 - Brighton
28 - Columbia
29 - Letitia
30 – Davy Jones (45th & I-5 On Ramp)
31 - Allison
32 - Galer
33 – Doug James
35 – S. Jackson
36 - Olive
40 – International Dist. Rect. (Tunnel)
41 – University St Rect. (Tunnel)
42 – Convention Pl. Rect. (Tunnel)
43 – Westlake (Monorail)

44 – Seattle Center (Monorail)
50 – East Base
51 – South Base
52 – North Base
53 – Atlantic Base
54 – DC Cont. Pnl. 2 Atlantic FW
55 – Central Base
56 – Ryerson Base
57 – Bellevue Base
58 - N.R.V.
59 – WFSC Barn
60 – International Dist. Station
61 – University St. Station
62 – Convention Pl. Station
63 – Pioneer Station
64 – Westlake

*Traction power wiring layers will be identified under the Trolley layers.

Pen Settings/Plotter Configuration

Standard ACAD Color Associations:

Very fine = Existing plan, section, detail & elevation elements, hatching.
8,10,11,21,31,41,51,61,71,81,91

Fine = Existing plan, section, detail & elevation element highlights, graphic line work, hatching.
1,7,12,22,32,42,52,62,72,82,92

Medium = Text, dimensions
4,13,23,33,43,53,63,73,83,93

Heavy = Text headings, reference text highlighting, demolition highlighting, new work
2,6,14,15,24,25,34,35,44,45,64,65,74,75,84,85,84,95

Bold = New work, plan headings, graphic line work
3,5,18,28,38,48,58,68,78,88,98

Very Bold = At user's discretion
19,29,39,49,59,69,79,89,99

Extreme Bold = At user's discretion
20,30,40,50,60,70,80,90

Screening = Gray scale for solid hatching, limited use for line work
100 - 109: white
110 - 119: 10%
120 - 129: 20%
130 - 139: 30%
140 - 149: 40%
150 - 159: 50%
160 - 169: 60%
170 - 179: 70%
180 - 189: 80%
190 - 199: 90%

Drawing Stamping Procedures

General

All drawings and Specification included in a contract shall have an engineers stamp.
Drawings issued for “Information Only” do not require a stamp.

Who Stamps

The licensed engineer (or architect) responsible for the design reflected on the drawing is to stamp the sheet.
Usually only one stamp will be on an individual drawing. If more than one discipline is significantly included on a drawing, a second stamp for the second discipline may be required. Alternately, the supervisor or managing engineer may elect to take responsibility for stamping the drawing. Double stamping will not be a practice. All in-house design drawings shall be co-signed by the engineering supervisor before 100% release, see title block section for appropriate signature locations.

Drawing Submittals

Pre 90% Review Package

Title block information filled-out to include Facility Name, Project Title, Drawing Description Title and Drawing Number.
Add Consultant Logo (if applicable).
Add "For Information Only" stamp.

90% Review Package

Add to title block information: Contract Number, EWR Number, Scale, Designed by, Drawn by, Checked by and Sheet Numbers.
Add "For Information Only 90% Review" stamp.

Permit Submittals

Remove [review status] stamp, note Permit submittal with date in the revision block. Drawings must be signed.

100% Contract Package

KC/Metro Design & Construction only, add to title block information: Recommended by, Approved by and Project Manager.
Add Engineers stamps.
Route through all personnel who are to sign the drawings prior to the Program Manager.
The Program Manager signs in the "Approved" section of the title block.

Addendum's/Contract Changes

In-house projects must be stamped by the Project Design Engineer.
Consultants shall stamp drawings that they produce.
Document changes, additional drawings produced by Design Section personnel shall be stamped as described above.

Consultant Drawings

We do not stamp, only approve.
Program Manager signs in the "Approved" section of the title block.

CAD Deliverables

Electronic deliverables for final submission shall include the following:

- All final CAD files.
- X-REF files.
- Non-standard shape/font files.
- Pen settings provided as a Color Dependent Plot Style Table (CTB) file, or chart of pen colors, pen widths and patterns in ASCII text, Word or Excel electronic file.
- Hardcopy and electronic index of drawings (G101 = xxx.dwg, etc.) with an X-REF matrix.

Revision History

Version 2

2.0 ..... 12/3/01.....Content rewritten
2.1 ..... 9/17/02.....Drawing Package Organization revised with new drawing numbering schema.
2.15 ..... 3/25/03.....CAD format clarified, security layers added, CAD deliverables requirements clarified
2.2 ..... 5/22/03.....Drawing number for Area Location number clarified
Section label and detail labels - added underline to text.
2.3 ..... 1/30/04.....Trolley Layers revised
2.4 ..... 4/21/04.....All layers revised
2.5 ..... 11/2/05.....Added (restored) underground electrical layers
2.5.1 ..... 4/12/06.....revised Internet URL for CAD.PDF
2.5.2 ..... 4/25/06.....Fixed detail & section numbering/lettering graphics & text
2.5.3 ..... 5/31/06.....Change AutoCAD file format to AutoCAD 2004
2.5.5 ..... 10/2008 .....Change AutoCAD file format to AutoCAD 2007 & miscellaneous updates
2.5.6 ..... 10/2009 .....Change section & plan bubble to half bubble (p. 10)
2.5.7 ..... 03/2012 .....File location noted
2.5.8 ..... 05/2013 .....Revisions to current CAD version, procedural changes, layer names.
2.5.9 ..... 08/2013 .....Revision to current ACAD, other updates to current standards.
2.5.10.....10/2013.....Conformed detail graphics; simplified document formatting.